The Beaver Lake Monitor

A publication of the Beaver Lake Management District Advisory Board

http://www.ci.sammamish.wa.us/BLMD.aspx#Home • Volume 10, Issue 1 • June 2009

Bulkheads Versus Natural Alternatives

Property owners on lake shorelines often construct bulkheads at the waterline to protect their land from wave erosion. However, waves typically do not pose erosion problems in smaller lakes such as Beaver Lake where no combustion engines are allowed. The shorelines are protected naturally by the intertwined root systems of the native plants that grow along the ordinary high water mark. In addition, tree litter and insects dropping into the water feed and shelter fish living in the shallow water, as well as the birds and amphibians that live along the edge.

With development and construction, natural shoreline features may be removed by the contractors or owners, who see them as messy or weedy, sending the wrong message to others about how much they love and care for their lake shoreline. But by clearing the plants from the edge of the lake, they have actually decreased the natural erosion protection that was in place and destroyed necessary refuge and food sources for fish and small land animals. Vertical bulkheads in the water actually increase turbulence and strength of waves just offshore, causing erosion at the toe of the bulkhead, coarsening the sediment make-up, and making it unusable for fish and amphibian spawning and rearing.

A shoreline design that incorporates a fringe of native plants that enjoy "wet feet" can restore the natural balance of the shoreline and return ecological functions to a lakeshore property, while still catering to the owner's desire for water access and providing the right sense of place to all who see and use it. Hardscape protection, if necessary, can be set back from the shoreline by using a combination of logs and rocks that will protect property, anchor the design, provide stability, maintain shoreline ecological functions, and still provide a satisfying garden feature.

Bulkheads can erode at the toe from increased wave action.

Shoreline vegetation protects water quality and adds wildlife habitat.

Native plants can be chosen that are visually pleasing, do not increase rapidly, and have seasonal garden interest. Both easy water access for recreation and natural habitat can be accommodated in good shoreline designs, while framing the view of the lake from the house and providing some personal privacy from lake users puttering around on the water. It is also possible to use landscaping design to discourage Canada geese, who love to lounge and feed on green lawns that sweep down to the water's edge, while leaving fecal offerings of fertilizer that wash into the water with rain and irrigation.

Ideas for designing and planting your lakeshore for both stability and wildlife can be found in several publications available from King County, the City of Seattle, and the Washington Department of Ecology. Be sure to check the current regulations of your local jurisdiction to be sure your proposed work is within the requirements of the Shoreline Master Program and to determine whether or not permits are required for the work.

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The Annual Beaver Lake Triathlon is Coming Soon!

When: Saturday August 15, 2009

Race Start: 7:45 a.m.

Place: Beaver Lake Park

Voiceline: 206-577-6902

E-mail: blt@beaverlake.org

Web site: www.beaverlake.org/blt

The organizers need you, your family and your friends to help them make this triathlon the best ever! They have tasks appropriate for the whole family so go to the Web site and see where you can help out! Then send an e-mail to blt@beaverlake.org. You will receive a race t-shirt and students can earn community service hours!

Progress Made on the Sammamish Shoreline Master Program Update

by City of Sammamish Staff

The City of Sammamish continues on track toward updating the Shoreline Master Program (SMP), in compliance with the Washington State Shoreline Management Act (RCW 90.58) and the 2003 State SMP Guidelines (WAC 173-26). These guidelines are available online at: http://www.ci.sammamish.wa.us/files/document/4559.pdf.

The SMP is intended to help the City balance shoreline development with preservation of shoreline ecology. It contains both policies and regulations that apply to designated "Shorelines of the State" and their associated "shorelands." In Sammamish, these areas include Pine Lake, Beaver Lake, Lake Sammamish, and all land 200 feet landward of these waters, plus associated wetlands. The SMP must provide for environmental protection, as well as for appropriate water-oriented use and development, including single family residential development.

Sammamish recognizes that effective and thorough public participation is critical to success in updating the SMP, as part of good governance and as required by state guidelines and the City's procedures. The Sammamish community has a history of energetic public involvement, and the city has sought the most effective opportunities for public participation throughout the SMP process. Public comments were collected before and after the publication of the Public Review Draft in September 2008. Between the initiation of the project in May 2006 and October 2008, the city received about 400 comments from residents, business interests, organizations, and the general public. Many comments have also been submitted in the last few months as a part of the City Council review process.

Dialogue Tables held at City Hall in 2009 on March 31st and on April 20th were well attended, with nearly 100 participants at each session. These events provided more opportunities for direct public involvement in the process of drafting the City of Sammamish SMP. The goal of the dialogue tables was to refine proposed amendments and generate options for City Council consideration. Participants selected tables according to their subject of interest.

On May 12, 2009, the City Council reviewed a Policy Options table that was based in part on public comments and proposed changes to the Planning Commission-Recommended Draft Shoreline Master Program (SMP). The City Council began to provide direction to staff on key policy areas at the June 2nd and June 16th council meetings. These policy areas are:

- non-conforming uses
- vegetation management areas/buffers/setbacks/OHWM
- impervious surface allowances
- docks (railings, ramps etc.)
- public access

The Policy Direction Summary presents these policy areas and options (available online at http://www.ci.sammamish.wa.us/files/document/5608.pdf). Staff will use the City Council direction to revise the SMP document and to issue a "Council Draft SMP" in late July or early August of this year.

Revisions to SMP regulations being considered by the City Council do not affect current and pending development applications for shoreline areas. Changes contained in the update will take effect once approved by both

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City Considers TDR Program

By Evan Maxim, Senior City Planner

The City of Sammamish City Council adopted the Town Center Plan in June of 2008, which provided an impetus for discussions about linking development of the Town Center with conservation efforts. One approach currently under discussion is a possible Transfer of Development Rights (TDR) program, which is a market-based mechanism that connects the demand associated with development with conservation of environmentally sensitive lands and open space. A TDR program, if adopted, will protect natural areas permanently, helping Sammamish ensure its quality of life and sense of place into the future.

At a basic level, a TDR program allows property owners to voluntarily sell "development rights" from one property to another property; the "sending site" (seller) is protected by a permanent conservation easement, while the "receiving site" (buyer) can increase its development capacity. The property owner of the sending site retains ownership of the property with the conservation easement. The property owner of the receiving site can, depending on the TDR program design, increase commercial space or increase residential density.

The TDR program is still in its initial policy discussion phase at the City, and several different policy objectives are being evaluated, including the ramifications of conservation that would result in additional commercial or residential development, the applicability of a TDR program to property where development is already constrained by critical areas, the appropriate methodology for calculating TDR incentives, and possible partnering with King County.

Beaver Lake Water Quality Update Winter 2009

Tributary 1 flows from a high class wetland to the north basin of Beaver Lake. The white box contains auto-sampling equipment for storm monitoring.

The Beaver Lake Management District (BLMD) contracts with the King County Lake Stewardship Program to track water quality in Beaver Lake and the creeks that flow into the lake basins. Inlet sampling starts in the fall with the new water year when the creeks begin to flow due to the onset of autumn rains and ends in late spring as they dry out. Samples are also collected by automated samplers during four rain events each year (see photo). These water quality data help the BLMD Advisory Board and the City of Sammamish identify management, protection, and restoration priorities within the district.

What We're Tracking

Although a variety of measurements are important in determining overall water quality, two parameters are of particular interest to the BLMD: phosphorus and alkalinity. This is because changes in these parameters are often associated with increased development, and phosphorus can directly affect the size of algae populations in the lake.

Phosphorus is a naturally occurring element and is necessary in small amounts for both plants and animals. However, many actions associated with residential development can increase concentrations beyond natural levels. High phosphorus concentrations may often lead to more frequent and dense algae blooms – a nuisance to residents and lake users, and a potential safety threat if blooms become dominated by species that can produce toxins.

Total alkalinity measures the water's capacity to resist changes in pH (acidity). Soft water has low alkalinity values, and hard water has high alkalinity values. Big and Little Beaver Lakes are both "soft water" lakes, with relatively low alkalinity (measured in milligrams of calcium carbonate per liter). Alkalinity often increases with new development, both as a result of new cement and concrete leaching calcium carbonate into the environment and as a consequence of disturbing local soils and adding fill. This can change the lake's natural pH range, which affects the biological communities adapted to the soft, slightly acidic waters of Beaver Lake. However, few studies have documented such changes, and no predictions on biological changes can be made for Beaver Lake at this time.

Other measurements made routinely include:

- Total suspended solids - the concentration of particles present
- Temperature
- Dissolved oxygen - the amount of oxygen available for aquatic organisms
- pH - measures how acidic the water is (hydrogen ion concentration)
- Conductivity - a measure of dissolved salts that can conduct electricity
- Water color - the amount of organic molecules that color water yellow/brown

Progress Made on the Sammamish Shoreline Master Program Update

(continued from Page 2)

the City Council and the Washington State Department of Ecology, most likely near the end of 2009 or possibly in 2010.

Please note that the maintenance of existing landscaping – such as mowing lawns or removing fallen tree limbs, etc. – is not affected by this program. However, all in-water work does require a permit from the state. If you have questions regarding requirements for development or activities on a specific parcel, please contact the city's front desk at 425-295-0500 and ask for the assistance of a city planner.

The SMP will be revised according to the City Council's policy direction and made available for public review in late July or early August, prior to the next public hearing session on September 1st. The City Council's goal is to adopt the Final SMP and transmit it to the Department of Ecology by September 22, 2009.

Public Comment forms are also available online and at City Hall. Questions should be addressed to Maren Van Nostrand at 425-295-0538 or mvannostrand@ci.sammamish.wa.us.

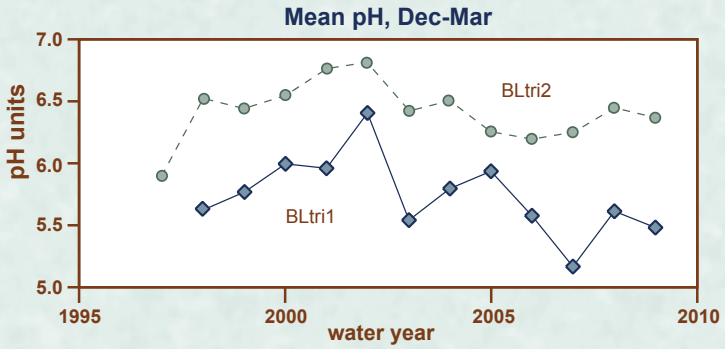
Please see the City Council web page for dates and packet information for upcoming meetings.

See other side for more Water Quality Updates

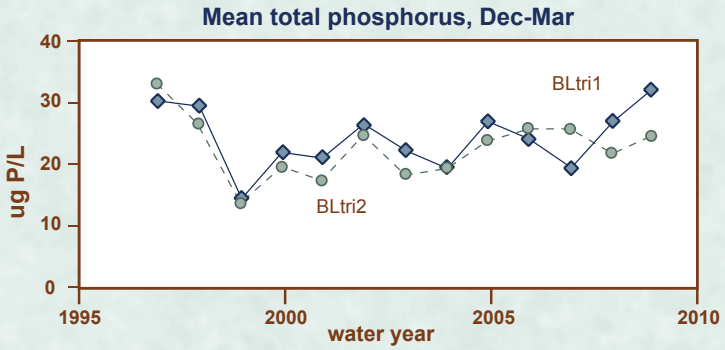
Beaver Lake Water Quality Update Winter 2009 *(continued from page 3)*

Charts and Analysis

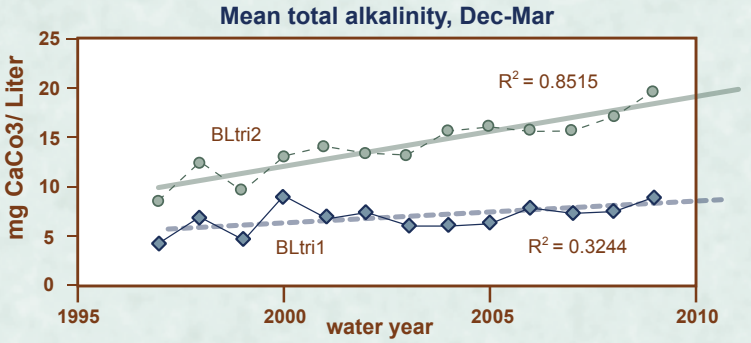
Average (mean) concentrations are charted for parameters measured during December through March, the months of highest continual flow of the creeks into the lake basins.



Although pH appeared to be increasing in both inlet streams between 1997 and 2002, it peaked in the latter year and has been lower in both streams since then. In BLtri2, the stream from Hazel Wolf wetland to the main Beaver Lake basin, pH appears to be relatively steady over the last 7 years, while it has varied more widely, but trended downward in BLtri1, the outflow from nearby wetland ELS21 to the north lake basin.

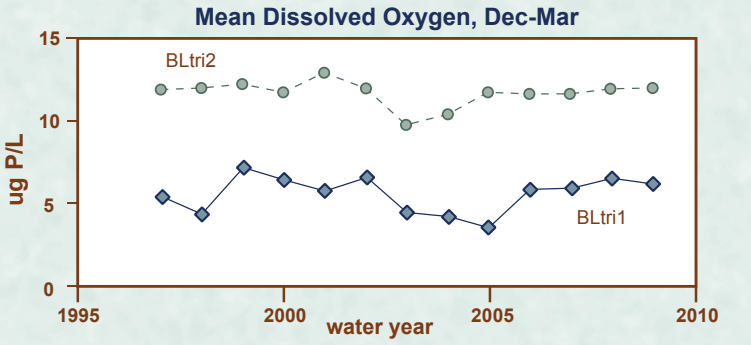


Winter phosphorus concentrations in the streams dropped a great deal between 1998 and 1999 and may have been increasing slowly since then. There is a large amount of variation from year to year, which is probably related to amount of precipitation and subsequent surface flow. While the 2008-9 average phosphorus concentration in BLtri1 was close to that of the late 1990s, concentrations in BLtri2 are still lower than previously and do not appear to be increasing over the last four years.



Total alkalinity measures the "softness" of the water, alternatively described as the buffering capacity or the amount of resistance to pH change. All of the water in the Beaver Lake basin is relatively soft, but the direct runoff from wetland ELS 21 contained in BLtri1 is much softer than in BLtri2.

Generally, development will make water harder from the introduction of metals and salts contained in urban runoff. This can be seen in the progressive increase in alkalinity over time in BLtri2, which has sustained more development in its catchment basin than BLtri1. The R2 value associated with each trend describes the degree of statistical strength that the trend has: the closer to 1, the stronger the correlation.



The amount of oxygen dissolved in the water is a good indicator of where the water came from, as well as how much life it can sustain. The oxygen found in BLtri1 is consistently lower than in BLtri2. This is because water from bogs generally are low in oxygen, as the large amount of organic matter accumulated over time leads bacteria to exhaust the oxygen supply before they can complete the decay process. Water coming directly from the bog will show this by having little oxygen dissolved in it.

In contrast, the water in BLtri2 flows through a much larger distance above ground before it reaches the lake, and oxygenation at our sampling station just before the lake is much higher. No trends over time have been detected in oxygenation for either inlet creek. Disturbance or development near ELS 21 may be detected in the future by looking at the rate of oxygenation of the water coming from the bog.

King County Recognizes Excess Phosphorus in Lawn Care

Phosphorus is a naturally occurring environmental element that is essential for algae and plant growth in a healthy lake ecosystem. Often it is in such small quantities in fresh water that it is the "limiting" nutrient, which is a chemical essential for plant growth, but available in smaller quantities than other necessary elements. Once it is used up, the plants and algae must stop growing. If more is added, plants and algae will keep growing until that nutrient, or another one, is exhausted.

In most King County lakes, including Beaver Lake, the limiting nutrient is phosphorus. When phosphorus is increased, the resulting algae growth hinders beneficial uses for humans and the following decomposition of the algae decreases the availability of dissolved oxygen for fish and other animals.

During the last two legislative sessions, the Washington Lake Protection Association (WALPA) has worked with elected representatives to pass a bill that limits the use of lawn fertilizers containing phosphorus on residential lawns across the state. While the state bills did not pass, King County Councilmember Julia Patterson, who lives on Angle Lake in SeaTac, took notice. She recognized the problems that excess phosphorus can cause on lakes and contacted King County Water and Land Resources Division to work with staff on a County ordinance that limits phosphorus-rich fertilizer use on lawns and calls for an education and outreach program to work with residents to limit their use of phosphorus fertilizer on lawns and thereby to increase water quality across the unincorporated areas of the County.

Most soils in King County contain enough phosphorus naturally to support healthy turf growth. This means that fertilizer application does little more than add phosphorus to our local water bodies as runoff. If you suspect your soil is phosphorus deficient, conducting a soil test will provide exact levels, from which you can calculate exact fertilizer application rates. The King County ordinance requires that a soil test be preformed to determine nutrient levels prior to application of phosphorus fertilizer on lawns.

Organic, slow release fertilizers containing some phosphorus are not prohibited from application because the runoff potential for excess phosphorus is much lower, as these products are formulated to release nutrients at low rates under normal conditions.

Why is the phosphorus ordinance focused only on lawns? Our lawns in the Pacific Northwest crave nitrogen that makes the grass blades lush and green. Phosphorus is essential for seed production, which is not necessary in a healthy lawn. To add phosphorus to our lawns when the soil does not need it is a waste of a very scarce and important nutrient. Because seed production is important for farms, vegetable or flower gardens for their products, phosphorus-rich fertilizer is not regulated for those uses.

The King County Ordinance, passed March 31, 2009, is a first step toward recognizing the problems that excess phosphorus is causing in our local waterways. It recognizes that education and outreach to local citizens will help in understanding the problem and that making wise choices in garden products will be part of the solution.

For further information:

To obtain a soil test contact the King Conservation District or use one of the recommend soil labs:

http://www.kingcd.org/pub_soil_soiltes.htm or http://king.wsu.edu/foodandfarms/documents/SoilTesting.pdf

To read the King County Ordinance:

http://kingcounty.legistar.com/LegislationDetail.aspx?ID=332671&GUID=85FB6ACF-6AA4-4809-8FCE-406541F7C5CD

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Department of Natural Resources and Parks
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City of Sammamish Washington

The Beaver Lake Monitor
Summer 2009

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Alternative Formats Available Upon Request.

Bulkheads Versus Natural Alternatives
Continued from Page 1

Pertinent Web sites:

Alternative bank protection methods:

www.wcy.hov/biblio/0006012a.html

Salmon-friendly gardening:

www.seattle.gov/util/Services/Yard/Natural_Lawn_&_Garden_Care/Salmon_Friendly_Gardening/index.html

Green shorelines guidebook:

http://www.seattle.gov/dpd/static/Green_Shorelines_Final_LatestReleased_DPDS015777.pdf

Shoreline control methods:

http://your.kingcounty.gov/ddes/acrobat/cib/16.pdf

Native plants interactive guide:

http://green.kingcounty.gov/GoNative/Index.aspx

Green living along the shoreline:

http://www.kingcounty.gov/environment/waterandland/lakes/facts/garden.aspx

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